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U.S. Department of Agriculture

# THE REA-V-DISCOUNT SYSTEM FOR ELECTRIC PLANT-USE IMPROVEMENT

MID NIGHT

NOON DAY

RECORD NO. 27-958 • USE LICENSED BY U.S. REA • BOYLE PATENTS PENDING • U.S. DEPARTMENT OF JUSTICE

NAME AND NUMBER OF DAY

MONDAY 28

MONTH YEAR

8 1939

NAME OF CIRCUIT

IOWA-48G-Poc.

R.E.A. V-DISCOUNT METER SYSTEM

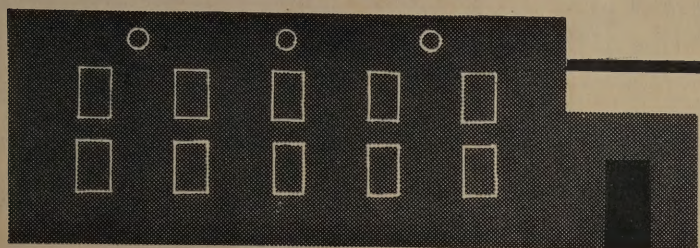
RURAL ELECTRIFICATION ADMINISTRATION U. S. DEPARTMENT OF AGRICULTURE





**A** is the "LOAD ANALYZER". It is a mechanism at the power supply point which analyses the plant load status periodically, say, every fifteen minutes, day and night. When it finds the total system output decreasing, it sends out timed "ripple impulses" over the ordinary transmission and distribution wires. These timed-impulses cause every consumer's meter to respond, and decrease or increase its dial rate of counting according to the system load changes. When the system load falls, the consumers may use more current for a given cost. That rebuilds the system load.

High average system load means low unit costs to consumers.



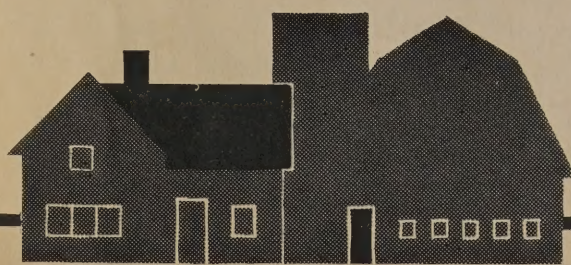
**C** is the "CONSUMER'S LOAD-UNIT CONTROLLER". Several may be used. Each of them "monitors" an important load unit (water heater, milk cooler, pump motor, or the like) on the consumer's premises.

The "CONSUMER'S LOAD-UNIT CONTROLLER" may be located near its particular load unit or else-where as determined by the consumer. A farmer may want to control all of his load-units from the kitchen of his house or inside the main barn door; the housewife may want to control her water heater, or her attic ventilator, or her living room air-conditioner from her kitchen. Such facility of control makes economies which rightfully belong to REA co-operative members.

The "CONSUMER'S LOAD-UNIT CONTROLLER" contains no moving part except an adjusting handle and a small switch that the handle operates. If the housewife gets more hot water than needed, she may move the controller handle to

**B** is the "VARIABLE DISCOUNT METER". It is to be located on the consumer's premises. The meter has two recording dials. The lower one measures kilowatt hours or ampere hours as desired and the upper one, the "discount dial", registers the same kind of units as the lower but always in lesser amount because of the discounts that have been allowed during the off-peak load-valley periods.

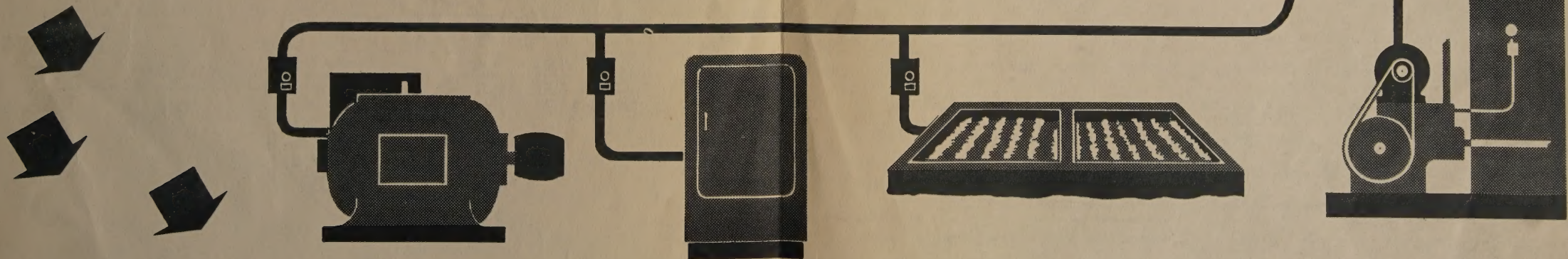
The meters also ordinarily contain an adjunct mechanism which "monitors" the Consumer's Load Unit Controllers, but for the larger consumer installations having many load units (say, more than ten) the adjunct "monitor" mechanism will be enclosed in a separate case located near the meter.



the first zone of discount, and if, after a few days trial she still has more than enough hot water, she may reduce to the next lower stage of discount, and so on.

Similarly, the man of the house may regulate the load units in his department—the barns, the poultry houses, the pump house, the seed-forcing-beds, etc., having each under the control of his hand for all of the electricity required at any time and always automatically kept at the zone of highest discount which will do the work to his satisfaction.

The individual motors or other load devices are turned on and off automatically by the REA-V-Discount System in obedience to the will of the consumer. Once the consumer has set the handle pointer the "CONSUMER'S LOAD-UNIT CONTROLLER" always sees to it that he gets not only the discount he sets the handle for, but also all zone rates of greater energy-discount which may be sent out later by the operation of the central station Load Analyzer.



THE REA-V-DISCOUNT SYSTEM IS AS SIMPLE AS **A B C**



# THE REA-V-DISCOUNT SYSTEM FOR ELECTRIC PLANT-USE IMPROVEMENT

ALLOWS ABUNDANT USE OF LOW UNIT-COST ELECTRICITY IMMEDIATELY AND CONTINUOUSLY LOWERS THE UNIT COST FURTHER AS THE COMBINED MEMBERSHIP USE OF ENERGY INCREASES

After a suitable rate schedule for a project has been determined by rate experts the REA-Variable Energy Discount Metering System, operating automatically and vigilantly day and night, gives the consumers greater and greater energy discount on their meter dials as the central station output falls through lower and lower zones in the off-peak valleys.

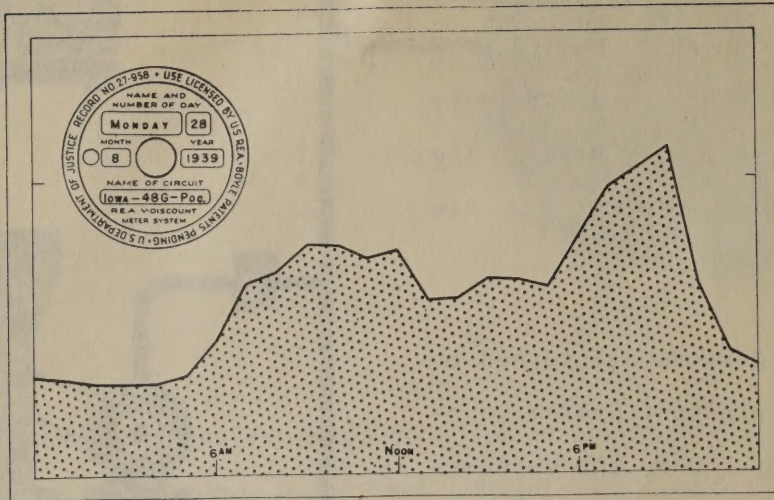
Each important load unit (water heater, milk cooler, pump-motor, or the like) on the member's premises is provided with an automatic control switch which he may set by hand at any time to whatever energy-discount zone he chooses. These devices, which are adjuncts to the consumer's meters, keep their load units as far away as the member wishes them to be from the high-cost system peaks.

The combined effect of controlling the load units on the entire system not only flattens down the system peaks (requiring less generating and transformer capacity) but, because of the lower unit charges (high discount) during the valley periods, the consumers will use a greater amount of energy.

The shifting of the peak energy down into the valleys and the increased use encouraged by the lower consumer charges during the valley periods will improve the available capacity use-factor of the entire plant, prime-movers, generators, transformers, and the distribution wires. The more of the total available plant that is used, every minute during the day and night, the greater the over-all economy will be to the consumers, individually and collectively, because otherwise each idle part of the plant would be aging and eating its head off in dead-loss overhead (interest, taxes, etc.) and dead-loss operating costs. Consumers must always pay for plant idleness but they get nothing for it.

It is contemplated that the REA-V-Discount System will lower the unit cost of energy so that REA cooperative members can afford to use electric energy for every purpose that will be of economic value and greater comfort, and greater pleasure benefit to them.





A graph showing the output of an electric generating station throughout any full day usually looks like the outline of a range of mountains seen against the sky. It has high peaks and deep valleys.

The high peaks mean that the dynamos, and also most of the total plant, are working hard--perhaps nearly up to their top limits; but the deep valleys mean that the plant as a whole is doing very little--perhaps only one dynamo out of many may be working at such times in the generating station. During the "valley" or "off-peak" periods the plant, to the extent that it is not in active use, is aging and eating its head off in dead-loss interest and other over-head and dead-loss operating costs which mount up relentlessly as a total loss to be paid out of the pockets of the plant's energy consumers.